REMARKS

Applicants have now had an opportunity to carefully consider the Examiner's comments set forth in the Office Action of July 3, 2008.

Applicants request reconsideration of the present application and claims as presented, in light of the following arguments and remarks.

The Office Action

Claims 1, 3-6, 8-28 and 46-48 are pending in the application. Claim 3 has been amended to provide proper dependency.

All claims stand rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Takehashi et al. (U.S. Patent No. 5,142,192) and Yano et al. (U.S. Patent No. 6,699,596).

Remaining Claims Are Distinguished From the Cited Art

Having reviewed the Examiner's position, and the art, Applicants wish to point out the disparity and patentable distinction between the teachings of the cited references, whether taken alone or in combination, and the invention as currently claimed. Applicant's have not amended the claims specific to the reference teachings at this time given that it is applicant's position, as set forth below, that the references fail to realize and teach the invention which is the subject hereof. Applicant's welcome the opportunity to respond to any questions the Examiner may yet have regarding the patentability of the invention claimed during a further telephone interview, to be conducted at the mutual convenience of both parties. That said, applicants point out that independent claims 1 and 46, and therefore all claims depending therefrom, recite a structure having a fluoride-containing layer positioned on the upper and/or lower surfaces of the blue emitting phosphor layer, this structure resulting in the fluoride layer and the phosphor layer forming a phosphor laminate having fluoride infused into the phosphor layer. Further, independent claim 17 and all claims depending therefrom recite the claimed phosphor laminate disposed on a glass substrate.

It is submitted that none of the prior art teach or fairly suggest this concept or the claimed construction. A benefit found by the concept is a more unified structure than shown in the prior art, and one which performs with improved capabilities as compared

to the prior art, as is shown clearly with reference to the Figures and Examples of the subject application, which fully support the claims as stated.

Particularly, the structure described above can be annealed at temperatures lower than those previously possible, while at the same time generating performance required to compete with high level CRTs for television applications and other high quality displays. Previously, such high quality devices were processed at temperatures higher than those of the present application, as claimed in the dependent claims, in order to achieve acceptable luminosity under feasible operating conditions. The Examiner is invited to review the application where the benefits of such a construction are clearly explained, noting particularly the Figures and Examples and the accompanying text and explanations. It is further noted that, as claimed, the inclusion of the fluoride-containing layer(s) in direct contact with the phosphor has an unexpected and advantage effect on the resulting laminate, both in terms of allowing the laminate to be deposited on a glass substrate, which allows for annealing temperatures well below those necessary for other such laminates thus enhancing production capabilities, as well as in the performance of the resulting phosphor laminate, which as compared to other non-fluorine containing phosphor laminates has enhanced performance.

More specifically, the invention provides a phosphor structure comprising a laminate of a rare earth metal activated barium thioaluminate or rare earth metal activated magnesium barium thioaluminate having a fluoride layer <u>directly</u> adjacent a top and/or bottom of the phosphor layer (see Figure 1, reference numbers 20/22), where some of the fluoride layer is infused into the phosphor layer such that annealing of the phosphor laminate can take place at lower temperatures <u>with no decrease in luminance</u>. The fluoride as infused therein acts to reduce the annealing temperature required to realize adequate phosphor luminance.

The Takehashi reference only teaches a thin film element with ZnS:Mn or SrS:Ce (as the luminous layer) where an insulating layer selected from a large number of different materials may also be used. The materials may be selected from oxides, nitrides, ferroelectric substances or fluorides. However, no particular type of insulating layer is taught to be most advantageous for a specific use. There is no suggestion that by choosing fluoride from the long list of possible insulating materials provided that the

resulting laminate will have the enhanced performance shown with reference to the remaining Figures of the subject application. Takehashi need not provide this teaching as the reference is not attempting to achieve this result, nor does it even consider the problem. In contrast, Takehashi is concerned with removing light and channeling the release thereof. In order to do so, light is emitted only from the end surfaces of the phosphor. A clear reading of the reference dictates application of the insulating layers on either side, i.e. end, of the luminous layer and NOT ON THE TOP AND/OR BOTTOM OF THE LUMINOUS LAYER. The reference further teaches that if transparent glass is employed it should be coated with an opaque ceramic or other such material, which helps to prevent light leaking from other than the desired point. Annealing is not taught at all in this reference because it is not of concern to the teaching provided. One skilled in the art would not look to this reference for a teaching regarding the infusion of fluoride into a blue light emitting phosphor, as it has nothing at all to do with that aspect of this art. This reference fails to teach or even suggest (1) the claimed structure, (2) the potential to reduce annealing temperature and the benefits of doing so, or (3) to specifically use a fluoride on the top and/or bottom of the phosphor layer in order to achieve a phosphor showing enhanced performance as set forth in the subject application and claims. In contrast from this teaching, and patentably distinct therefrom, is the provision in the subject application and claims of the fluoride layer on the top and/or bottom of the blue light emitting phosphor, which is critical to infusion of the fluoride into the phosphor material, and which in turn allows a reduction in the annealing temperature without negative effects on the phosphor performance. In summary, the Takehashi reference teaches a completely different structure with different types of phosphor that have different chemical properties that may be provided with an insulating layer on the sides, but provides no teaching as to how or why one would want to choose a fluoride-containing layer or where to place it to achieve the claimed phosphor laminate. Given that the reference does not teach the use of the claimed blue phosphor, there can be no teaching as to why one would choose to use fluoride in combination therewith. Merely providing a claimed component in a long laundry list of possible layers, without any teaching as to how to properly choose one material from the listing to achieve the currently claimed phosphor structure is

tantamount to no teaching at all.

The Yano reference is only relied upon for teaching a blue light emitting phosphor. Yano does not teach or suggest the use of a fluoride-containing layer on the top and/or bottom of the phosphor layer to form a phosphor laminate. The examiner suggests that the Yano reference teaches annealing at 400 to 800°C. However, the reference actually teaches that a substrate should be selected to have a melting point of at least 600°C, and more preferably 700°C, and most preferably 800°C. Therefore, the reference teaches that the optimum annealing temperature for the phosphor is preferably done at 800°C or more. In contrast, the subject application teaches a desire to not use a temperature in excess of 700°C, and optimally to be well below this temperature. The reference, therefore, teaches away from the claimed invention. As well it would given that it no where suggests nor teaches the use of the claimed fluoride-containing layer or the advantages thereof.

It is seem above that each reference alone fails to teach the claimed phosphor. Further, any combination of the cited references continues to fall short of teaching the claimed invention. Because neither reference includes a teaching or suggestion to the specific use of a fluoride-containing layer on the top and/or bottom of a blue light emitting phosphor layer, the combination cannot fairly be said to teach the claimed invention. Neither reference provides a guide as to how to select fluoride as the infusing material, nor that it must be placed directly adjacent the top and/or bottom surface(s) of the phosphor layer. Because the references each fail to appreciate the advantage to be gained by such a structure, neither reference alone, nor the references taken together, even the best light, teach the capability to anneal at lower temperatures, and the performance advantages gained by allowing the fluoride to infuse the phosphor layer at this annealing temperature. In short, the invention is based on the formation of a phosphor laminate that has a lower annealing temperature. Because neither reference appreciates this problem, neither reference tries to solve this problem, and neither contains any teaching directed thereto. Absent the use of the subject application as a blue print for achieving the invention claimed, one skilled in the art would not look to these references for assistance, and even with this reference that teaching remains absent from the references.

In addition to the foregoing, applicants argue that the examiner has failed to supply the necessary teaching to support the combination made. One skilled in the art would not substitute a completely different chemical material (fluoride) into a different type of device (top and/or bottom layers on the phosphor that include the claimed fluoride) and expect to get the claimed result. The thermodynamics of such devices requires rigorous testing, and the references, alone or together, provide no teaching for such testing.

For at least the above-cited reasons, it is submitted that all pending claims are patentably distinguished over the cited art.

To further emphasize the distinctions between the concepts of the present application and the cited art, the Examiner is invited to review the subject examples of devices constructed according to the teachings of the present application. It is particularly noted that devices which do not include the aluminum fluoride layer will have a higher threshold voltage than those constructed according to the teachings of the present application.

The lower threshold voltage is advantageous in that either the display operative voltage can be lowered in order to lower the power consumption of the device, or the phosphor thickness can be increased to increase the threshold voltage to that of the prior art devices, with an expectation of increased luminance. It is considered a device as claimed herein having the threshold voltage and luminance set forth in the pending claims is not taught or suggested by the cited art.

Applicants present the above arguments in order to move prosecution of the application forward. However, as Applicants respectfully traverse the Examiner's arguments and positions in the previous Office Actions, and in the telephone interviews, they also reserve the right to further their arguments at the appropriate time.